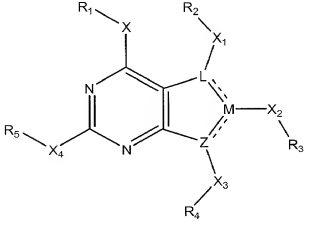
What is claimed is:

1. A compound, and pharmaceutically acceptable salts, solvates and prodrugs thereof, having the formula :



where X, X_1, X_2, X_3 and X_4 are from one to about three atoms, are the same or different and are independently selected from the group consisting of hydrogen, an alkyl group, a alkenyl group, an heteroalkyl group and an heteroalkenyl group,

and any carbons or nitrogens of said alkyl group, alkenyl group, heteroalkyl group or heteroalkenyl group can optionally be substituted with a straight, branched or cyclic lower alkyl group of from 1 to about 6 carbons;

Z is selected from the group consisting of C, CH, CH_2, N, NH, S, O, CH=CH, CH=N and N=CH;

L is selected from the group consisting of C, CH, CH_2, N, NH, S, O, CH=CH, CH=N and N=CH, but when Z is C, CH, CH=CH or CH_2 then L is N, NH, S or O;

M is selected from the group consisting of carbon and CH;

the chemical bond between L and M is selected from the group consisting of a single bond and a double bond, and M is carbon when the bond is a double bond, and M is CH when the bond is a single bond;

the chemical bond between M and Z is selected from the group consisting of a single bond and a double bond, and M is carbon when the bond is a double bond, and M is CH when the bond is a single bond;

but when the bond between L and M is a double bond the bond between M and Z is a single bond;

at least one of R_1, R_2, R_3, R_4, or R_5 is present;

R_1, R_4 and R_5 are the same or different and are selected from group consisting of hydrogen, a cyclic aliphatic group, a cyclic heteroaliphatic group, an aryl group, a heteroaryl group, an alkylaryl group, a alkylheteroaryl group, a substituted aryl group, a substituted heteroaryl group, a substituted alkylaryl group and a substituted alkylheteroaryl group;

R_2 and R_3 are the same or different and are selected from group consisting of hydrogen, a cyclic aliphatic group, a cyclic heteroaliphatic group, an aryl group, a heteroaryl group, an alkylaryl group, a alkylheteroaryl group, a substituted aryl group, a substituted heteroaryl group, a substituted alkylaryl group, a substituted alkylheteroaryl group, and *p*-aroyl-glutamate;

and each substituent of any substituted group is the same or different and is selected from the group consisting of a straight, branched or cyclic lower alkyl, alkenyl or alkynl group of from one to about 6 carbons, an alkoxy group, an alkoxyaryloxy group, and a halogen.

2. The compound of Claim 1, wherein Z is N.

3. The compound of Claim 2, wherein X_4 is NH_2.

4. The compound of Claim 3, wherein X is NH and R_1 is *m*-bromobenzene.

5. The compound of Claim 4, wherein X_2 is CH_2-CH_2.

6. The compound of Claim 5, wherein R_3 is 2-pyridine.

7. The compound of Claim 5, wherein R_3 is benzene.

8. The compound of Claim 5, wherein R_3 is *p*-methoxy benzene.

9. The compound of Claim 5, wherein R_3 is *o*-chlorobenzene.

10. The compound of Claim 5, wherein R_3 is 1-naphthalene.

11. The compound of Claim 5, wherein R_3 is 2-naphthalene.

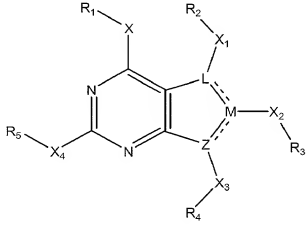
12. The compound of Claim 1, wherein Z = O.

13. The compound of Claim 12, wherein X and X_4 are NH_2.

14. The compound of Claim 13, wherein X_1 is $CH=C\begin{smallmatrix}CH3\\ \diagdown\\ \end{smallmatrix}$,

and R_2 is 2-napthyl.

15. A method of treating a patient with an illness by inhibiting at least one enzyme selected from the group consisting of receptor tyrosine kinase, dihydrofolate reductase and thymidylate synthase, by administering an effective amount of a compound having the formula:



where X, X_1, X_2, X_3 and X_4 are from one to about three atoms, are the same or different and are independently selected from the group consisting of hydrogen, an alkyl group, a alkenyl group, an heteroalkyl group and an heteroalkenyl group,

and any carbons or nitrogens of said alkyl group, alkenyl group, heteroalkyl group or heteroalkenyl group can optionally be substituted with a straight, branched or cyclic lower alkyl group of from 1 to about 6 carbons;

Z is selected from the group consisting of C, CH, CH_2, N, NH, S, O, CH=CH, CH=N and N=CH;

L is selected from the group consisting of C, CH, CH_2, N, NH, S, O, CH=CH, CH=N and N=CH, but when Z is C, CH, CH=CH or CH_2 then L is N, NH, S or O;

M is selected from the group consisting of carbon and CH;

the chemical bond between L and M is selected from the group consisting of a single bond and a double bond, and M is carbon when the bond is a double bond, and M is CH when the bond is a single bond;

the chemical bond between M and Z is selected from the group consisting of a single bond and a double bond, and M is carbon when the bond is a double bond, and M is CH when the bond is a single bond;

but when the bond between L and M is a double bond the bond between M and Z is a single bond;

at least one of R_1, R_2, R_3, R_4, or R_5 is present;

R_1, R_4 and R_5 are the same or different and are selected from group consisting of hydrogen, a cyclic aliphatic group, a cyclic heteroaliphatic group, an aryl group, a heteroaryl group, an alkylaryl group, a alkylheteroaryl group, a substituted aryl group, a substituted heteroaryl group, a substituted alkylaryl group and a substituted alkylheteroaryl group;

R_2 and R_3 are the same or different and are selected from group consisting of hydrogen, a cyclic aliphatic group, a cyclic heteroaliphatic group, an aryl group, a heteroaryl group, an alkylaryl group, a alkylheteroaryl group, a substituted aryl group, a substituted heteroaryl group, a substituted alkylaryl group, a substituted alkylheteroaryl group, and *p*-aroyl-glutamate;

and each substituent of any substituted group is the same or different and is selected from the group consisting of a straight, branched or cyclic lower alkyl, alkenyl or alkynl group of from one to about 6 carbons, an alkoxy group, an alkoxyaryloxy group, and a halogen.

16. The method of Claim 15, wherein said compound is incorporated in a suitable pharmaceutical carrier.

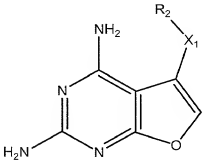
17. The method of Claim 15, wherein said illness is cancer.

18. The method of Claim 15, wherein said illness is selected from the group consisting of infection caused by *Pneumocystis carinii*, *Toxoplasma gondii*, *Mycobacterium tuberculosis* and *Mycobacterium avium*.

19. The method of Claim 16, wherein said carrier is selected from the group consisting of physiologic saline and 5% dextrose for injection.

20. The method of Claim 16, including administering said compound by a method selected from the group consisting of parenteral administration, oral administration and topical administration.

21. A compound, and pharmaceutically acceptable salts, solvates and prodrugs thereof, having the formula:

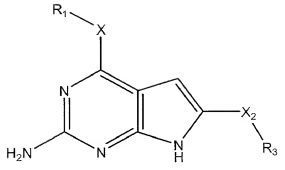


where X_1 is CH=C, and R_6 is selected from the group consisting of hydrogen and a straight, branched or cyclic lower alkyl group of from 1 to about 6 carbons;

R_2 is selected from group consisting of hydrogen, a cyclic aliphatic group, a cyclic heteroaliphatic group, an aryl group, a heteroaryl group, an alkylaryl group, a alkylheteroaryl group, a substituted aryl group, a substituted heteroaryl group, a substituted alkylaryl group, a substituted alkylheteroaryl group, and *p*-aroyl-glutamate;

and each substituent of any substituted group is the same or different and is selected from the group consisting of a straight, branched or cyclic lower alkyl, alkenyl or alkynl group of from one to about 6 carbons, an alkoxy group, an alkoxyaryloxy group, and a halogen.

22. A compound, and pharmaceutically acceptable salts, solvates and prodrugs thereof, having the formula:



(3)

where X and X_2 are from one to about three atoms, are the same or different and are independently selected from the group consisting of hydrogen, an alkyl group, a alkenyl group, an heteroalkyl group and an heteroalkenyl group,

and any carbons or nitrogens of said alkyl group, alkenyl group, heteroalkyl group or heteroalkenyl group can optionally be substituted with a straight, branched or cyclic lower alkyl group of from 1 to about 6 carbons;

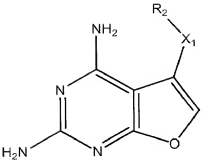
at least one of R_1 or R_3 is present;

R_1 is selected from group consisting of hydrogen, a cyclic aliphatic group, a cyclic heteroaliphatic group, a cyclic aromatic group, a heterocyclic aromatic group, an aryl group, a heteroaryl group, an alkylaryl group, a alkylheteroaryl group, a substituted aryl group, a substituted heteroaryl group, a substituted alkylaryl group and a substituted alkylheteroaryl group;

R_3 is selected from group consisting of hydrogen, a cyclic aliphatic group, a cyclic heteroaliphatic group, an aryl group, a heteroaryl group, an alkylaryl group, a alkylheteroaryl group, a substituted aryl group, a substituted heteroaryl group, a substituted alkylaryl group, a substituted alkylheteroaryl group, and *p*-aroyl-glutamate;

and each substituent of any substituted group is the same or different and is selected from the group consisting of a straight, branched or cyclic lower alkyl, alkenyl or alkynl group of from one to about 6 carbons, an alkoxy group, an alkoxyaryloxy group, and a halogen.

23. A method of treating a patient with an illness by inhibiting at least one enzyme selected from the group consisting of receptor tyrosine kinase, dihydrofolate reductase and thymidylate synthase, by administering an effective amount of a compound having the formula:



where X_1 is $CH=\overset{R_6}{\overset{|}{C}}$, and R_6 is selected from the group consisting of hydrogen and a straight, branched or cyclic lower alkyl group of from 1 to about 6 carbons;

R_2 is selected from group consisting of hydrogen, a cyclic aliphatic group, a cyclic heteroaliphatic group, an aryl group, a heteroaryl group, an alkylaryl group, a alkylheteroaryl group, a substituted aryl group, a substituted heteroaryl group, a substituted alkylaryl group, a substituted alkylheteroaryl group, and *p*-aroyl-glutamate;

and each substituent of any substituted group is the same or different and is selected from the group consisting of a straight, branched or cyclic lower alkyl, alkenyl or alkynl group of from one to about 6 carbons, an alkoxy group, an alkoxyaryloxy group, and a halogen.

24. The method of Claim 23, wherein said compound is incorporated in a suitable pharmaceutical carrier.

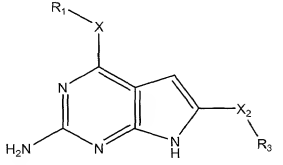
25. The method of Claim 23, wherein said illness is cancer.

26. The method of Claim 23, wherein said illness is selected from the group consisting of infection caused by *Pneumocystis carinii*, *Toxoplasma gondii*, *Mycobacterium tuberculosis* and *Mycobacterium avium*.

27. The method of Claim 24, wherein said carrier is selected from the group consisting of physiologic saline and 5% dextrose for injection.

28. The method of Claim 24, including administering said compound by a method selected from the group consisting of parenteral administration, oral administration and topical administration.

29. A method of treating a patient with an illness by inhibiting at least one enzyme selected from the group consisting of receptor tyrosine kinase, dihydrofolate reductase and thymidylate synthase, by administering an effective amount of a compound having the formula:



(3)

where X and X_2 are from one to about three atoms, are the same or different and are independently selected from the group consisting of hydrogen, an alkyl group, a alkenyl group, an heteroalkyl group and an heteroalkenyl group,

and any carbons or nitrogens of said alkyl group, alkenyl group, heteroalkyl group or heteroalkenyl group can optionally be substituted with a straight, branched or cyclic lower alkyl group of from 1 to about 6 carbons;

at least one of R_1 or R_3 is present;

R_1 is selected from group consisting of hydrogen, a cyclic aliphatic group, a cyclic heteroaliphatic group, a cyclic aromatic group, a heterocyclic aromatic group, an aryl group, a heteroaryl group, an alkylaryl group, a alkylheteroaryl group, a substituted aryl group, a substituted heteroaryl group, a substituted alkylaryl group and a substituted alkylheteroaryl group;

R_3 is selected from group consisting of hydrogen, a cyclic aliphatic group, a cyclic heteroaliphatic group, an aryl group, a heteroaryl group, an alkylaryl group, a alkylheteroaryl group, a substituted aryl group, a substituted heteroaryl group, a substituted alkylaryl group, a substituted alkylheteroaryl group, and *p*-aroyl-glutamate;

and each substituent of any substituted group is the same or different and is selected from the group consisting of a straight, branched or cyclic lower alkyl, alkenyl or alkynl group of from one to about 6 carbons, an alkoxy group, an alkoxyaryloxy group, and a halogen.

30. The method of Claim 29, wherein said compound is incorporated in a suitable pharmaceutical carrier.

31. The method of Claim 29, wherein said illness is cancer.

32. The method of Claim 29, wherein said illness is selected from the group consisting of infection caused by *Pneumocystis carinii*, *Toxoplasma gondii*, *Mycobacterium tuberculosis* and *Mycobacterium avium*.

33. The method of Claim 30, wherein said carrier is selected from the group consisting of physiologic saline and 5% dextrose for injection.

34. The method of Claim 30, including administering said compound by a method selected from the group consisting of parenteral administration, oral administration and topical administration.